

Silica increases water availability for plants: Researchers discover a way to enhance food security

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As a result of climate change, more frequent and longer drought periods are predicted in the future. Drought risks may decrease agricultural

yield. Researchers at the University of Bayreuth and the Leibniz Centre for Agricultural Landscape Research (ZALF) have now discovered a way to mitigate this problem: Amorphous silica is able to significantly increase the amount of available water for plants. This offers an opportunity to enhance global food security despite climate change. The researchers presented their findings in the journal *Scientific Reports*. They suggest a soil management that ensures a higher amorphous silica content.

The new research results are the product of close collaboration between environmental geochemists and [soil](#) physicists. The scientists have systematically investigated how [amorphous silica](#) affects the ability of soils to absorb and store water, for the first time. The results are impressive: "Even if the proportion of amorphous silica in soils increases by just one percent by weight, the amount of plant available water in soils increases by up to 40 percent—or even more," reports Dr. Jörg Schaller from the Department of Environmental Geochemistry at the University of Bayreuth and ZALF. This is because gels, which contain enormous amounts of water, form in the soil out of amorphous silica molecules. These water supplies are easily accessible to the roots of plants.

However, it has been known for some time that conventional methods of agriculture lead to a steady decline of the content of amorphous silica in the soil. In combination with the expected consequences of [climate change](#), this may lead to serve drought problems in e.g. agricultural systems in future, decreasing yield even more. This increases the risks to global food security.

"Our new study shows a way to mitigate this risk. For this, [soil management](#) should be modified to increase the amorphous silica stocks in soils. Moreover, artificial produce amorphous silica—which has the same [chemical properties](#) as the biogenic silica—should be used as soil

amendments. Such soil silica amendments may play an important role in global food security in the future," Schaller said.

More information: Jörg Schaller et al. Biogenic amorphous silica as main driver for plant available water in soils, *Scientific Reports* (2020). DOI: [10.1038/s41598-020-59437-x](https://doi.org/10.1038/s41598-020-59437-x)

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